

**Decision Support Systems:
Challenges and
Opportunities**

**Presentation to
McGraw-Hill Inc.**

**by
Jack Keen
INPUT**

June 10, 1985

INPUT



TODAY'S OBJECTIVE

- **Identify Key Application and Market Opportunities that Impact:**
 - Product Planning
 - Acquisition Strategies
 - Marketing Support
 - Sales Methods
 - Internal Productivity

INPUT



AGENDA

- Research Design
- Information Services Directions
- Systems Trends
- DSS Scope
- Markets
- Opportunities
- Conclusions and Recommendations

INPUT

RESEARCH DESIGN

INPUT



MULTICLIENT STUDY

- **INPUT Prepared Prospectus of Issues**
- **Clients Agreed to Share Costs**
 - **Agence De L'Informatique**
 - **Boeing Computer Services**
 - **Citicorp**
 - **Cognos**
 - **Comshare**
 - **Control Data**
 - **Execucom**
 - **McGraw-Hill**
 - **Micro Data Base Systems**
 - **Pansophic**
 - **Planmetrics**

INPUT



STUDY DESIGN

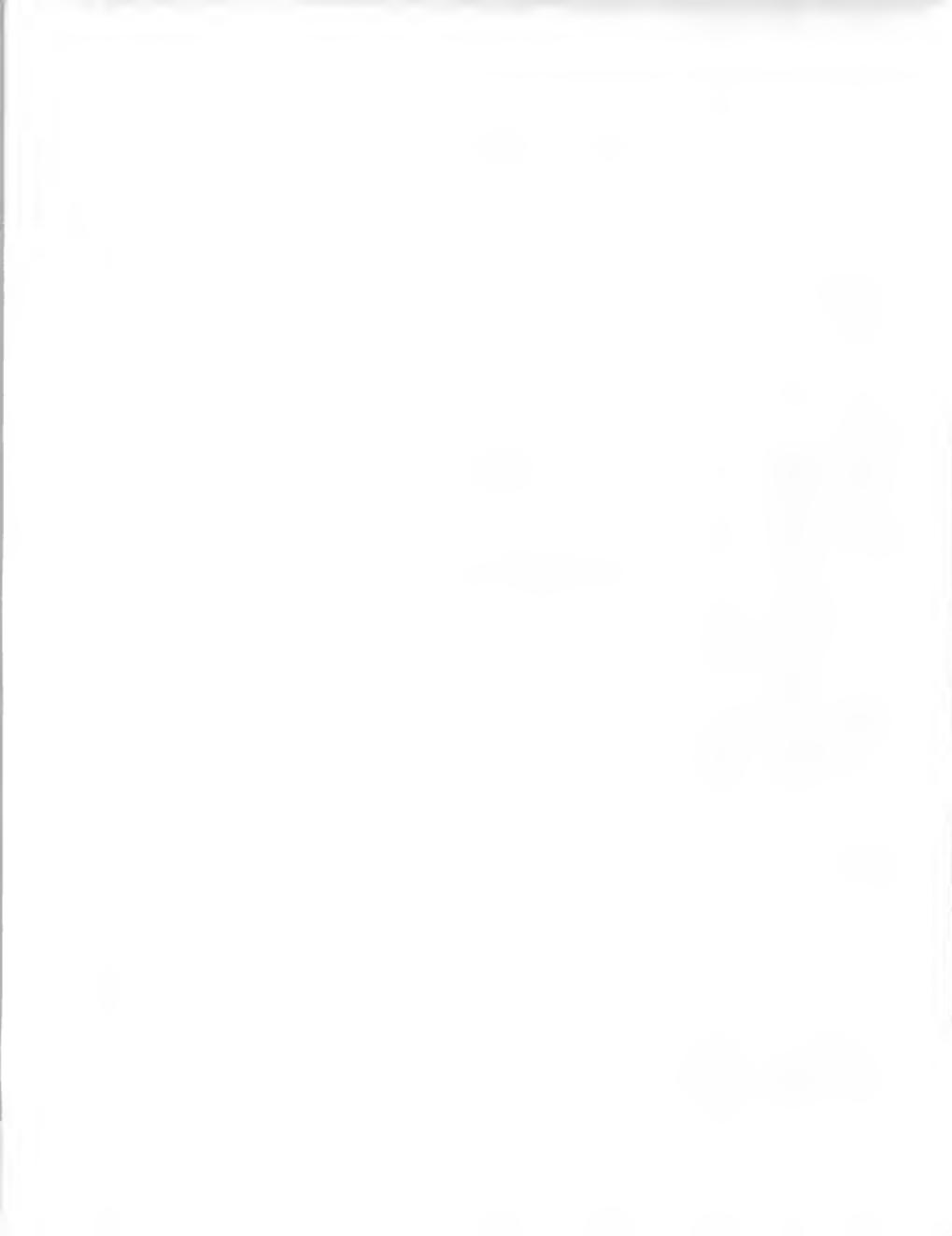
- **Subject Research**
 - INPUT Data Files
 - INPUT Reports
 - Industry Experts
- **Field Research Program**
 - Vendors
 - IS Users
 - End-Users
- **Company Multiples (2-3/Company)**
- **On-Site User Profiles**

INPUT



**INFORMATION
SERVICES
DIRECTIONS**

INPUT



Definitions

INFORMATION SERVICES

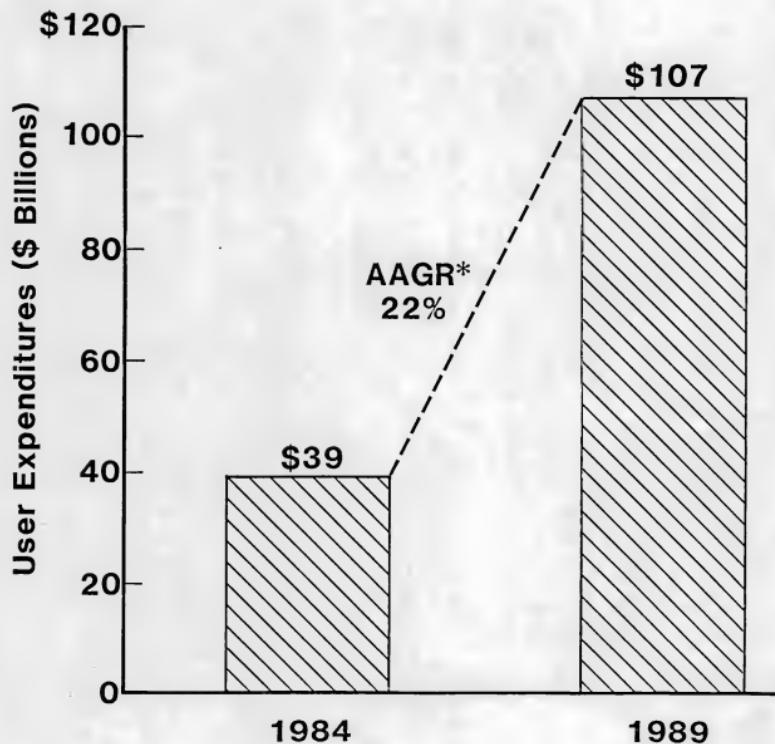
Includes

- **Software Products**
- **Professional Services**
- **Processing Services**
- **Turnkey Systems**

INPUT

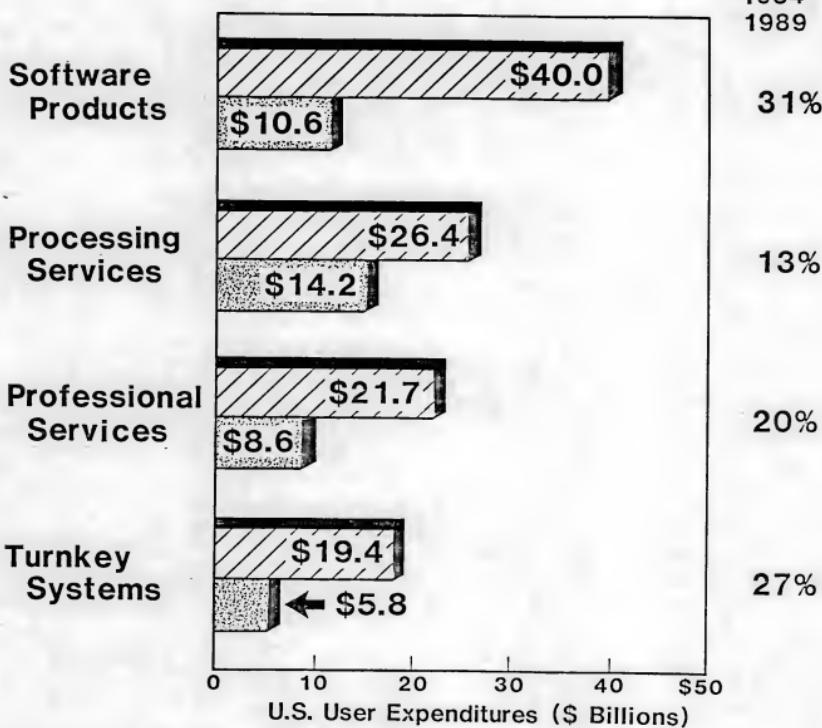


INFORMATION SERVICES: A \$107 BILLION POT OF GOLD



* Average Annual Growth Rate

SOFTWARE PRODUCTS TO LEAD FIVE-YEAR GROWTH

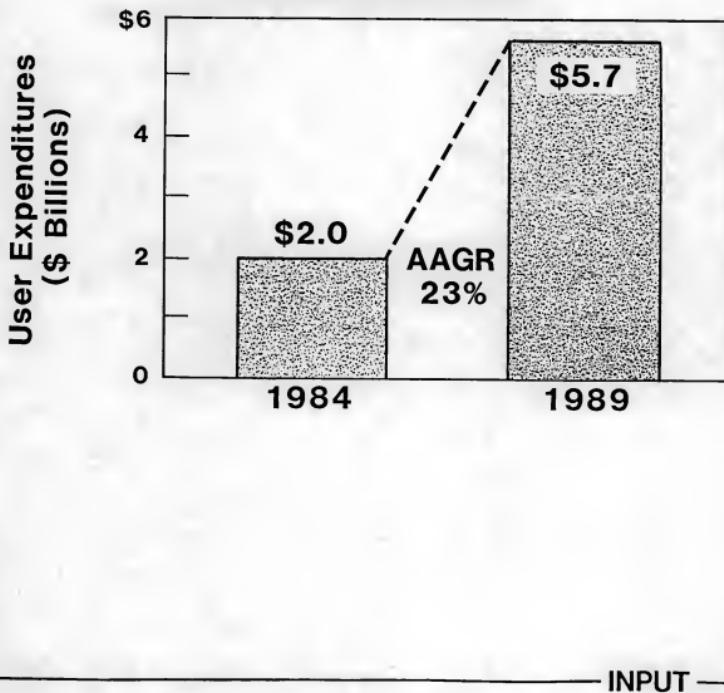


1989		\$107.5	AAGR*
1984		\$39.1	22%

*Average Annual Growth Rate



ON-LINE DATA BASES ARE ALIVE AND WELL



THE GIANTS ARE COMING

Type Vendor	Share of Information Services Market	
	1983	1989
Independents	69%	59%
Computer/ Communications Hardware	10%	16%
Subsidiaries	10%	19%
Other	11%	6%
Total	100%	100%

INPUT

**SYSTEMS TRENDS:
ACCELERATING COMPLEXITY**

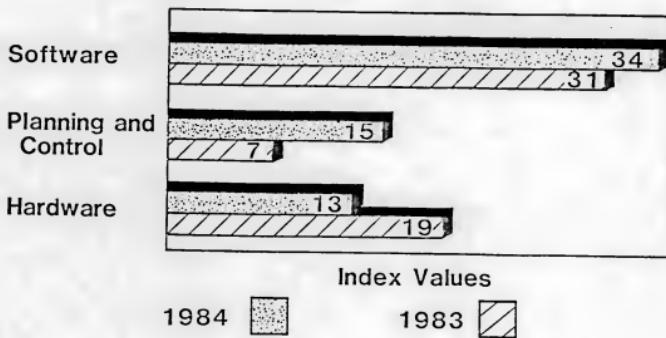
- Information Systems Role

- Systems Evolution

INPUT



SOFTWARE STILL DOMINATES OBJECTIVES



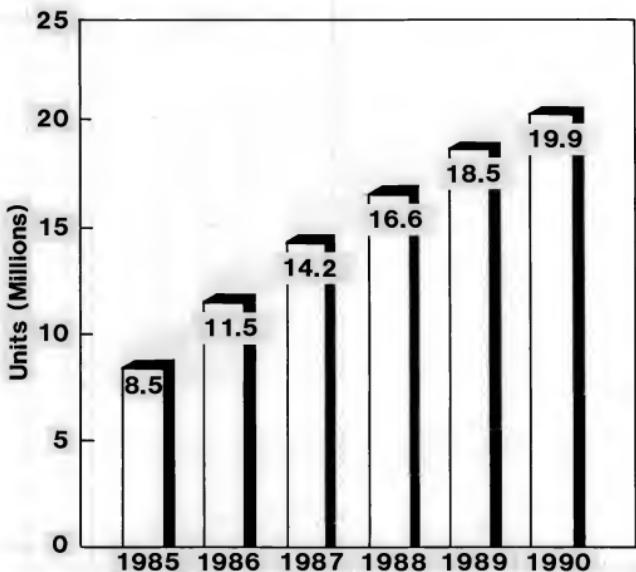
INPUT

THE I.S. ATTITUDE (Most Significant Changes Affecting I.S.)

- | | |
|-----------------------------------|--------------|
| 1. End-User Computing | 31.7% |
| 2. Software | 18.3% |
| 3. Hardware | 12.4% |
| 4. Corporate Relationships | 8.4% |
| 5. Planning & Control | 5.3% |

INPUT

NET INSTALLED BASE OF MICROCOMPUTERS, 1985-1990

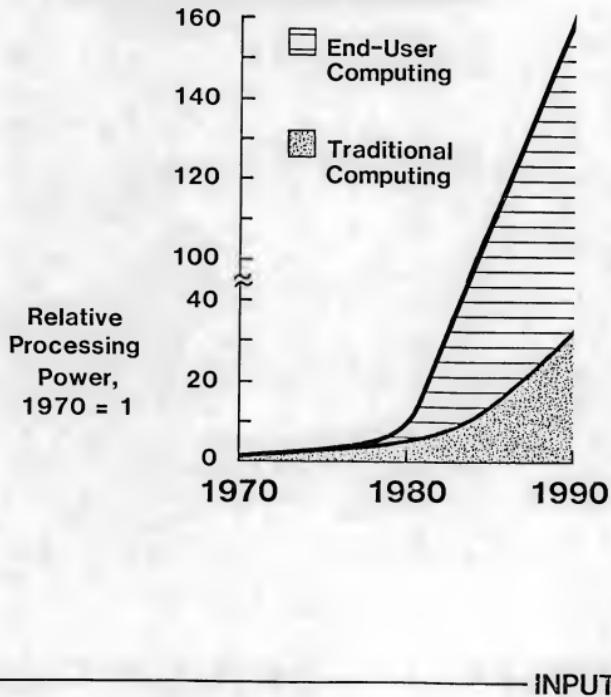


**U.S. sales of microcomputers selling for less than
\$15,000 that are used for business**

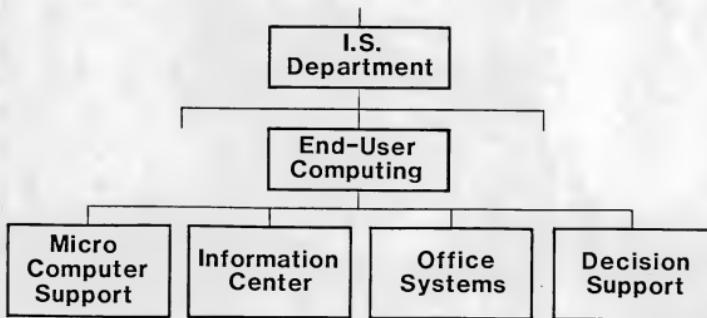
INPUT



EXPLOSIVE GROWTH IN END-USER COMPUTING



ORGANIZATIONAL RESPONSE



I.S. TO EVOLVE TO CONSULTANT ROLE

Future IS Skills

- Advising
- Coaching
- Guiding
- Facilitating
- Teaching



Consulting
IS Services

from

TECHNICIAN
(1960-1984)



to

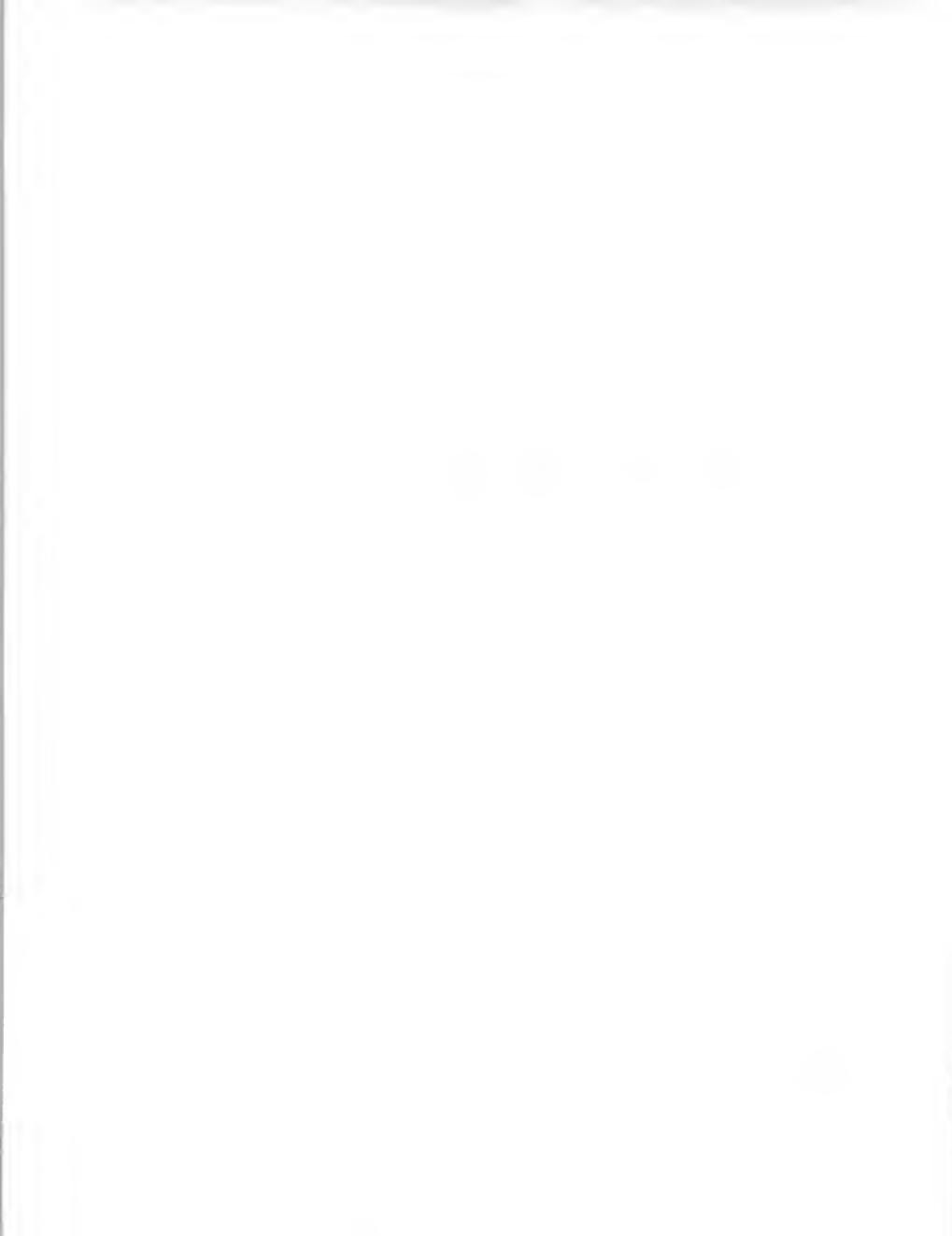
MARKETERS
(1985+)

INPUT

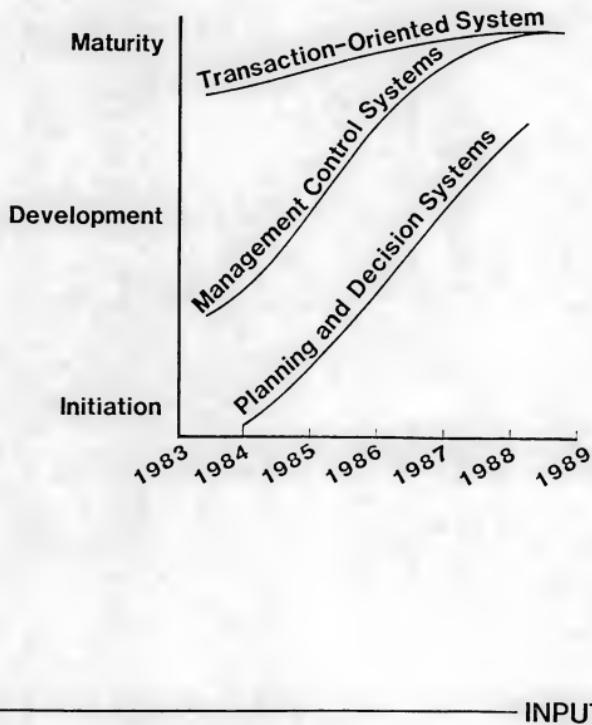


THE SYSTEMS EVOLUTION

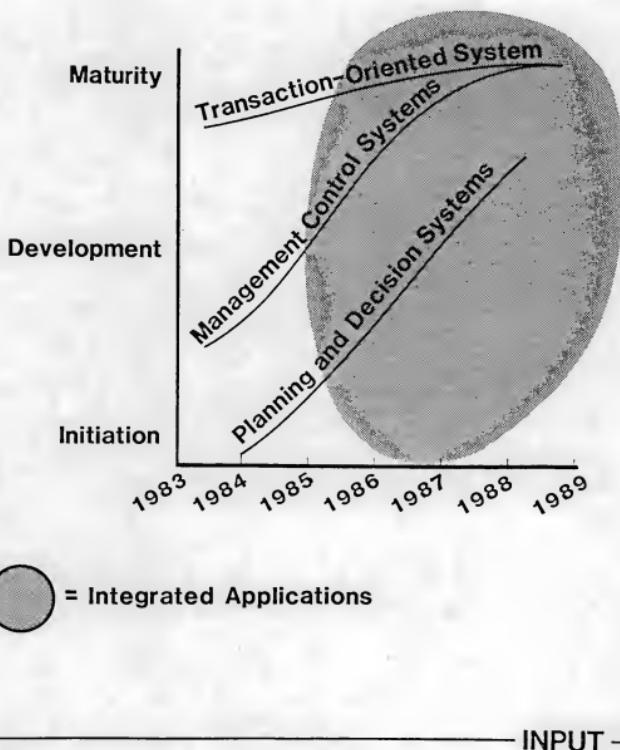
INPUT



PLANNING SYSTEMS ARE IN THEIR INFANCY

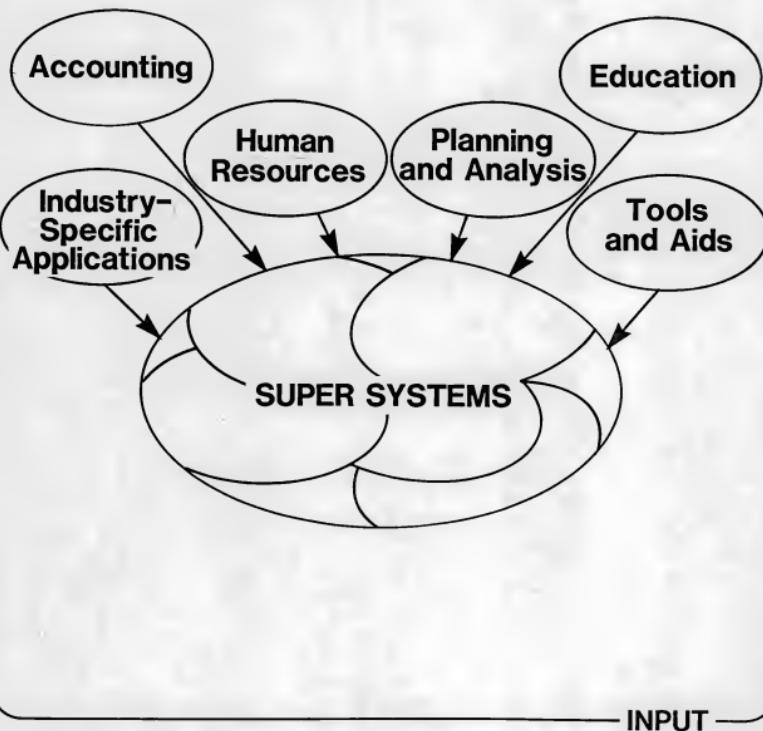


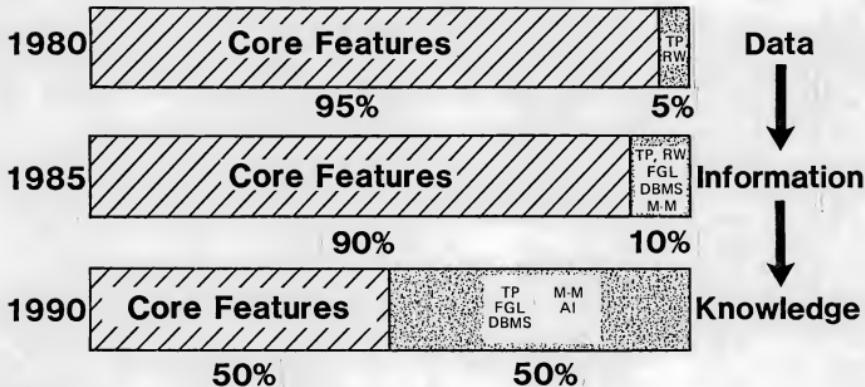
THE OPPORTUNITY= INTEGRATED APPLICATIONS





INCREASING SEGMENT INTEGRATION



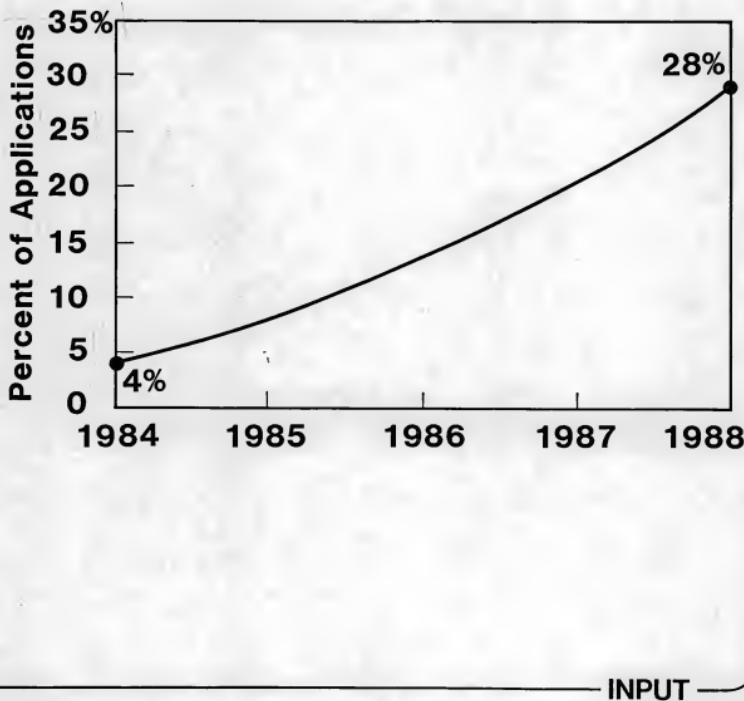
APPLICATION SOFTWARE COMPONENT EVOLUTION

 = Systems Software (Tools and Aids)

(TP = Teleprocessing, RW = Report Writing, FGL = Fourth-Generation Language,
DBMS = Data Base Management System, M-M = Micro-Mainframe Communication)

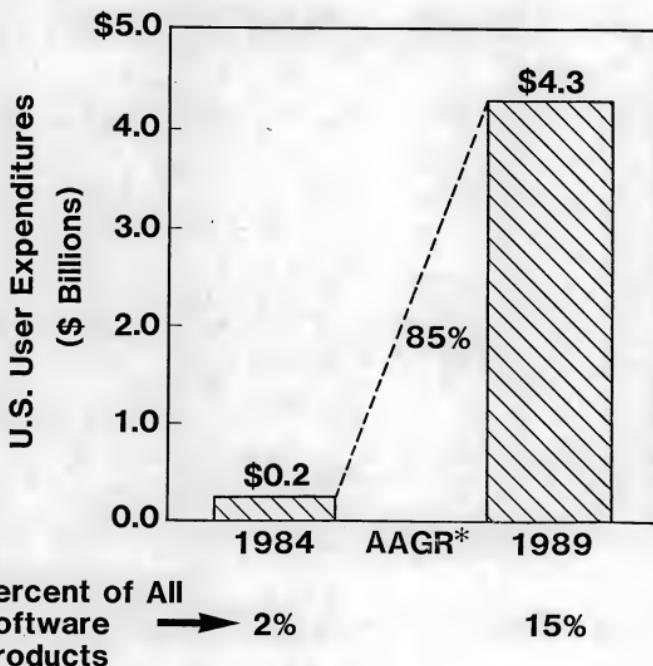
Percent = User Perceived Value

MICRO-MAINFRAME APPLICATIONS GROWTH: 1984-1988





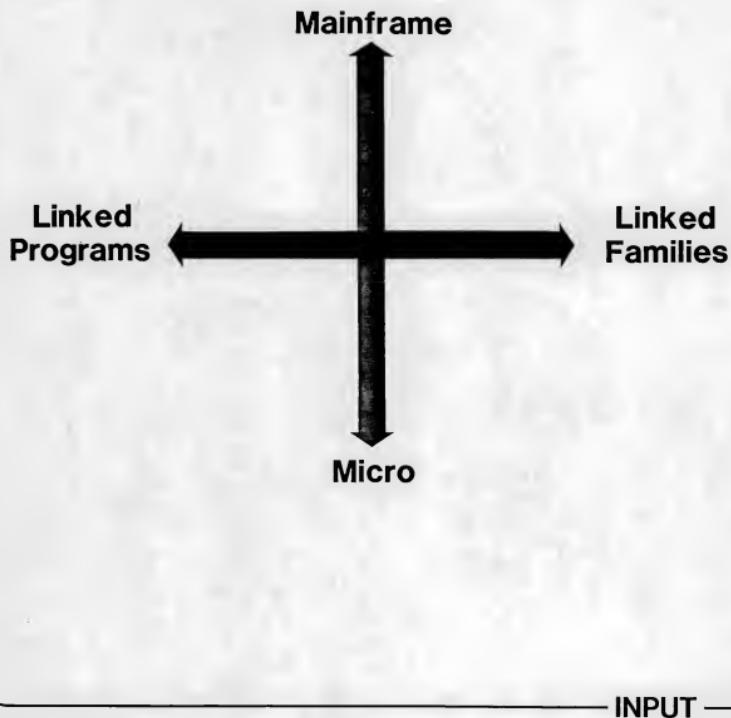
INTEGRATED-DBMS SOFTWARE (Mainframe/Mini)



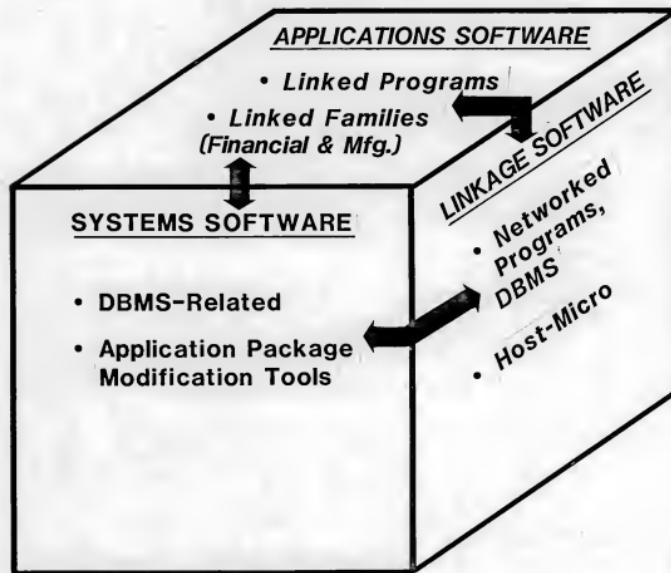
*Average Annual Growth Rate

INPUT

FOUR WAY INTEGRATION



THE FUTURE IS A THREE-DIMENSIONAL WORLD

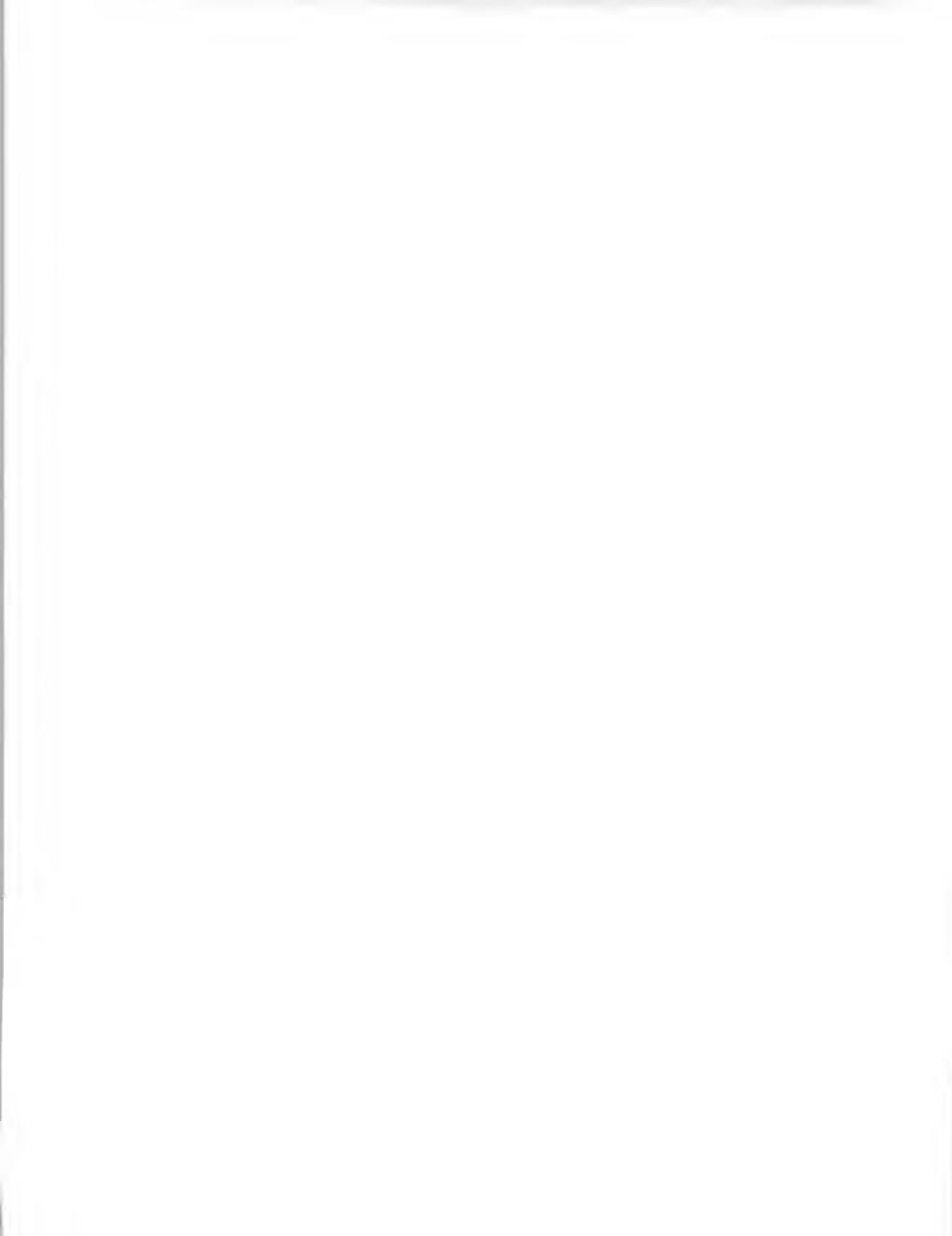


- Vendors Inhabiting a Single Plane will Be at Risk From Those Who Offer a Fuller Range
- Opportunity & Risk: Pressures for Both Integration & Distribution
- Cullinet Success Factor & Springboard



DSS SCOPE

INPUT



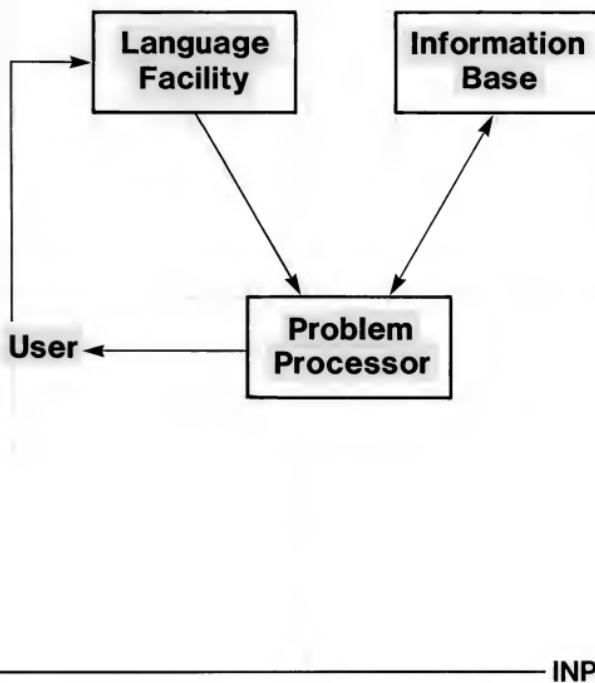
DECISION SUPPORT/DECISION MAKING IN THE ORGANIZATION





DECISION SUPPORT SYSTEMS

Functional Elements





GENERAL DSS SYSTEM CHARACTERISTICS

- **Development Initiated by Senior Management**
- **Output Directed at Senior Management**
- **Short System Life Cycle**
- **Limited Modification of System**
- **Used a Limited Number of Times**

INPUT



GENERAL DSS SYSTEM CHARACTERISTICS

- **Packages Provide Only Part of Functional Requirements**
- **High Volume Data Requirements**
- **Based on Most Current Data**
- **Require External Information**

INPUT



DECISION SUPPORT

TOOLS

- **Fourth Generation Languages**
- **Integrated Systems**
- **Financial Modeling Packages**
- **Spreadsheets**
- **Data Base Management Systems (PC Only)**
- **Graphics Capabilities**
- **Inquiry Systems**
- **Statistical Analysis Facilities**
- **Forecasting Systems**
- **Operations Research Capabilities**
- **Economic Data Bases**

ARTIFICIAL INTELLIGENCE

- **Natural Language Query Systems**
- **Expert Systems**
- **Knowledge-Based Systems**
- **Robotics**
- **Vision Systems**
- **Voice Recognition/Synthesis**
- **Expert-System Generators**
- **Specialized Languages (Lisp and Prolog)**
- **Fifth Generation Computing**
- **AI Machines**

**SPECIFIC CHARACTERISTIC
DEPEND ON . . .**

- **Type of Decision Support System**
- **Stage of User Development/
Maturity**
- **User/Vendor Perspective**

INPUT



TYPES OF DSS

- **Planning and Analysis Systems**
- **Operational Production Systems**

INPUT



DSS MATURITY BY BUSINESS CLASS

DSS MATURITY STAGES	1984 BUSINESS CLASSES		
	I	II	III
I (Early)	60	70	80
II (Maturing)	25	20	15
III (Fully Mature)	15	10	5

PERCENT OF COMPANIES IN EACH CATEGORY

DSS MATURITY STAGES	1989 BUSINESS CLASSES		
	I	II	III
I (Early)	10	30	40
II (Maturing)	30	30	40
III (Fully Mature)	60	40	20

INPUT



STAGE 1 - EARLY DSS ENVIRONMENT CHARACTERISTICS

- **Functional System Characteristics**
 - Modeling in RCS Environment
 - Limited Financial DSS Applications
 - DSS Applications Standalone
 - Financial Analyst Main User
 - Data Entered Manually
 - Unfocused Use of Personal Computers
 - One or Two Decision Support Products
 - Basic Reporting Requirements

INPUT



STAGE I - EARLY DSS ENVIRONMENT CHARACTERISTICS

- Other Issues
 - DSS Expenditures Easily Segregated
 - No Information Center
 - Still Developing Baseline Applications Systems (Non-DSS)
 - Users "Computer Literate"
 - Little IS Recognition of DSS

INPUT



STAGE II - MATURING DSS ENVIRONMENT CHARACTERISTICS

- **Functional System Characteristics**
 - RCS DSS Applications Migration In-House
 - Broad Base of Financial DSS Applications
 - DSS Applications with Basic Links
 - Corporate Planning Main User
 - Some Automatic Data Transfer from Production Systems
 - Growing Base of Personal Computers Communicating with Mainframe
 - Wide Variety of DSS Products
 - Enhanced Reporting/Graphics Capabilities Required

INPUT



STAGE II - MATURING DSS ENVIRONMENT CHARACTERISTICS

- Other Issues**

- DSS Expenditures Less Apparent**
- Early Stage IC Established**
- Early Systems Data Base Environment Established**
- Less Sophisticated Computer Users**
- IS Rivalry with End-User Computing**

INPUT



STAGE III - FULLY MATURE DSS ENVIRONMENT CHARACTERISTICS

- **Functional System Characteristics**
 - RCS Mainly Utilized for Informational Data Bases
 - Broad Base of DSS Applications - Many Areas
 - DSS Applications Fully Interfaced
 - Users Throughout Organization
 - Production Data Base Updates Routinely Provided
 - Large Number of Personal Computers Linked to Mainframe
 - "Gateway" Interface to DSS Products
 - Sophisticated Reporting/Graphics Capabilities

INPUT



STAGE III - FULLY MATURE DSS ENVIRONMENT CHARACTERISTICS

- **Other Issues**

- **Great Difficulty in Determining DSS Expenditures**
- **Information Center Actively Used**
- **Have Integrated Data Base Application System Environment**
- **Increasing Computer Literacy Required**
- **IS Active Participant in DSS Developments**

INPUT



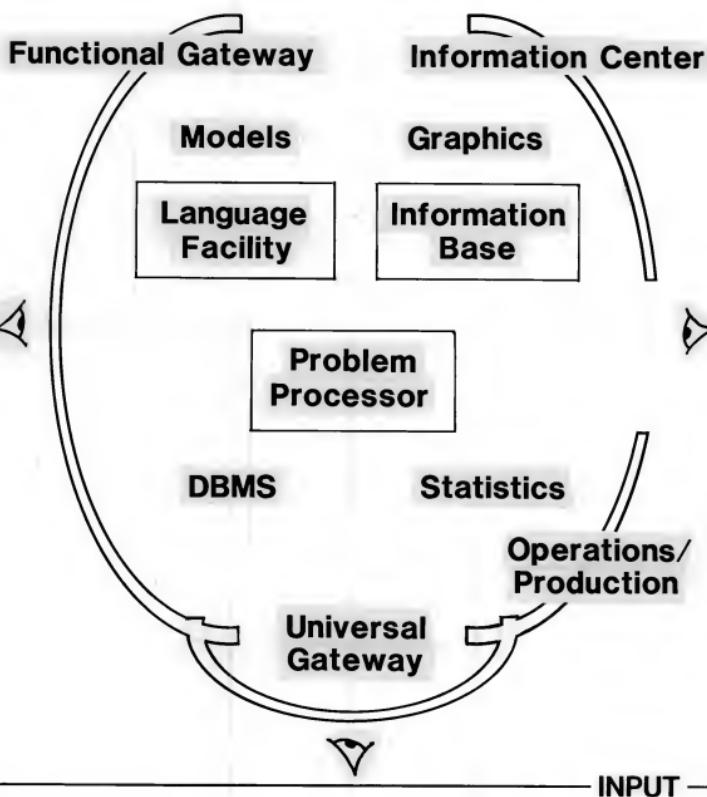
STAGE III - FULLY MATURE DSS ENVIRONMENT CHARACTERISTICS

- **Unique Stage Characteristics**
 - Systems Prototyping Common Practice
 - IC May Be on Dedicated Mainframe
 - Experimenting with Artificial Intelligence Applications

INPUT



USERS' VIEWS OF DSS





VENDORS' VIEWS OF DSS

Models

Graphics

Language Facility

Information Base

Problem Processor

DBMS

Statistics



INPUT



TOP TEN DSS FUNCTIONS AND ACTIVITIES

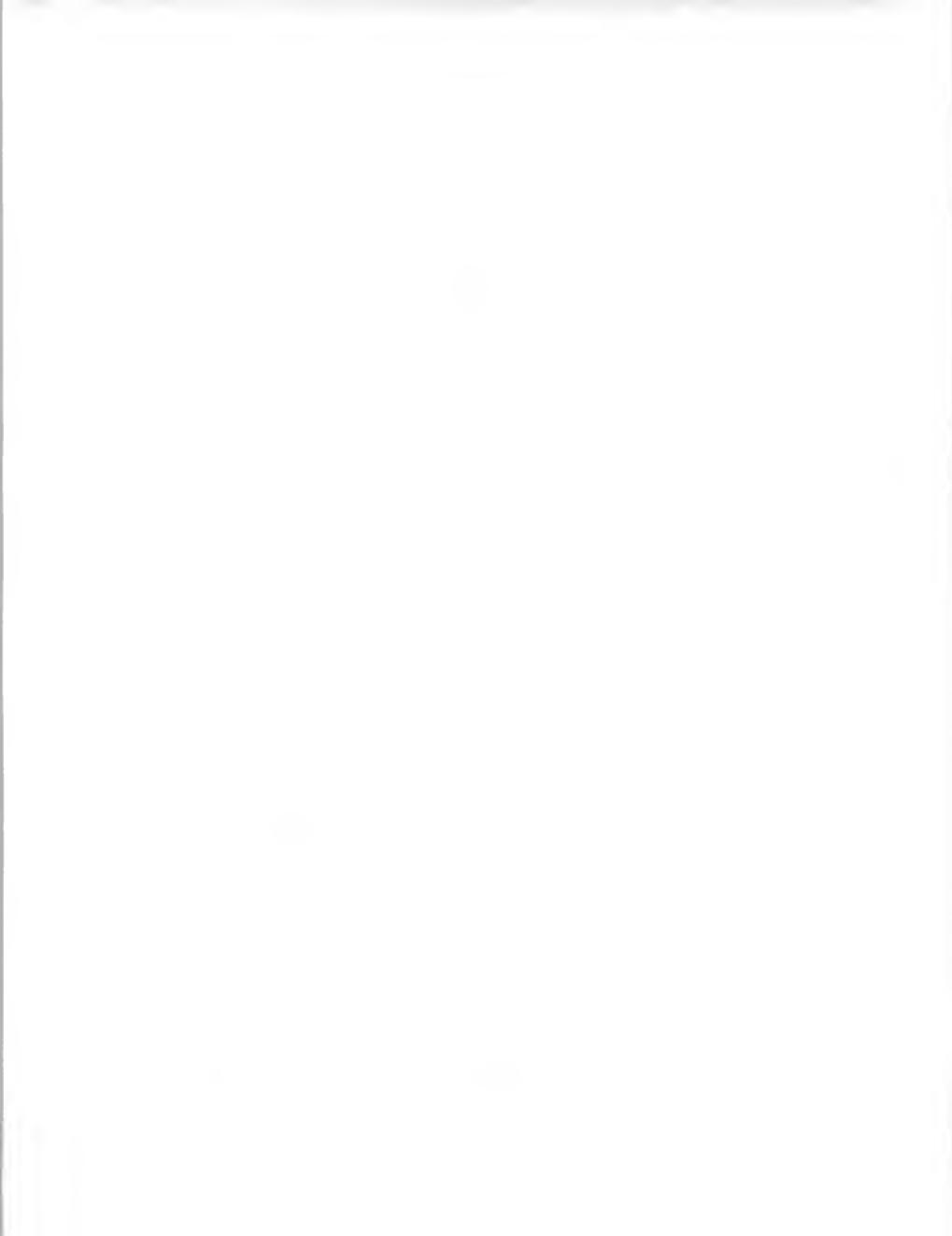
- 1. Data Acquisition**
- 2. Data Base Management**
- 3. Forecasting Capability**
- 4. Modeling Language**
- 5. Spreadsheet**
- 6. Report Generation**
- 7. Graphics**
- 8. Financial Functions**
- 9. Statistical Functions**
- 10. Telecommunications**

INPUT

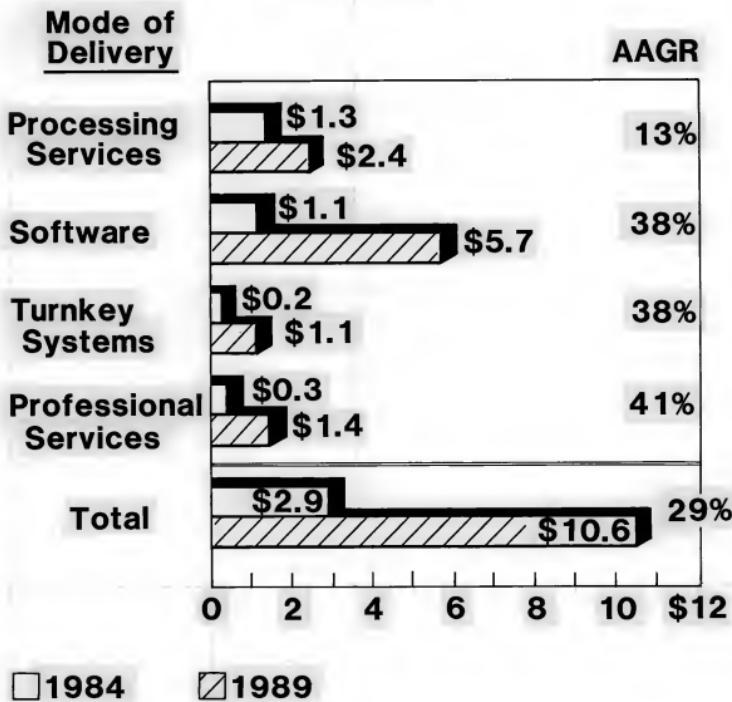


MARKETS

INPUT

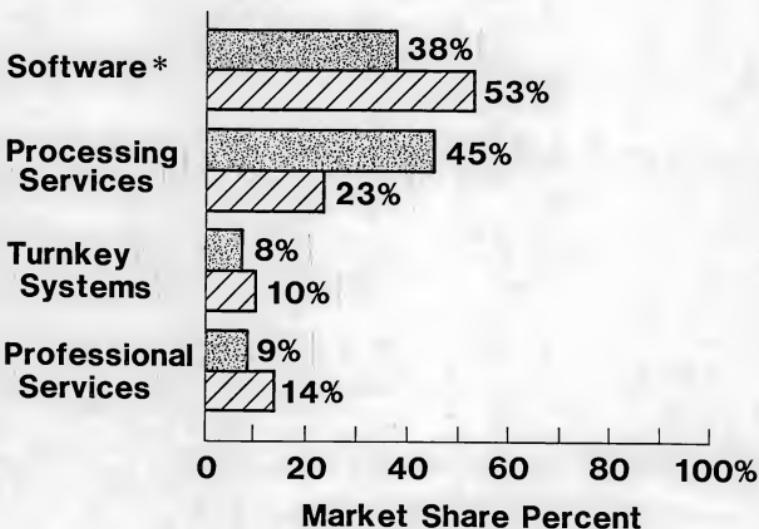


DECISION SUPPORT EXPENDITURES (\$ Billions)





DSS MARKET SHARE BY MODE OF DELIVERY



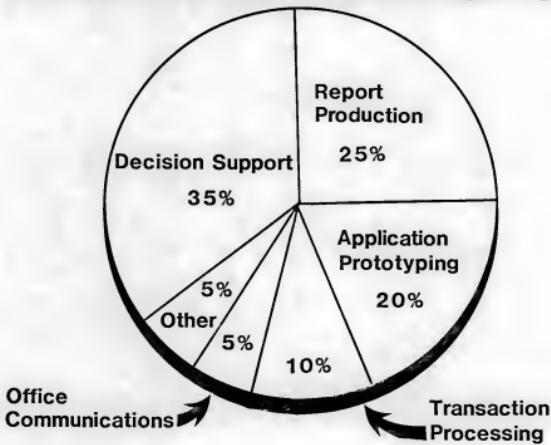
■ 1984

□ 1989

* 1984 - Mainframe 17%, Micro 21%

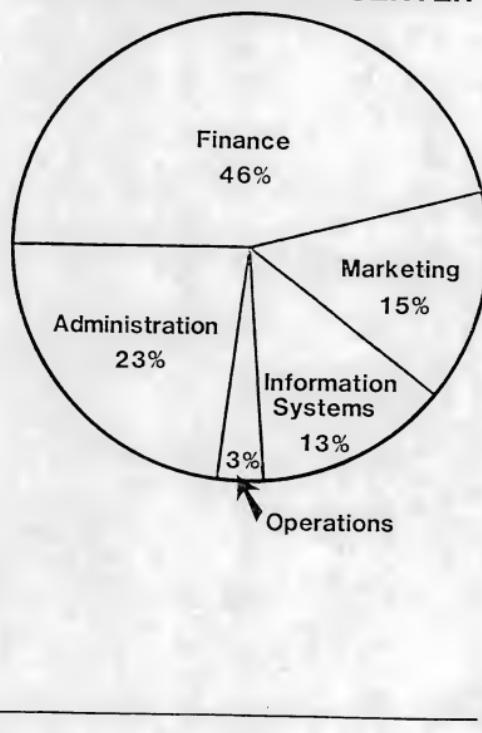
1989 = Mainframe 21%, Micro 32%

DECISION SUPPORT LEADS INFORMATION CENTER APPLICATIONS



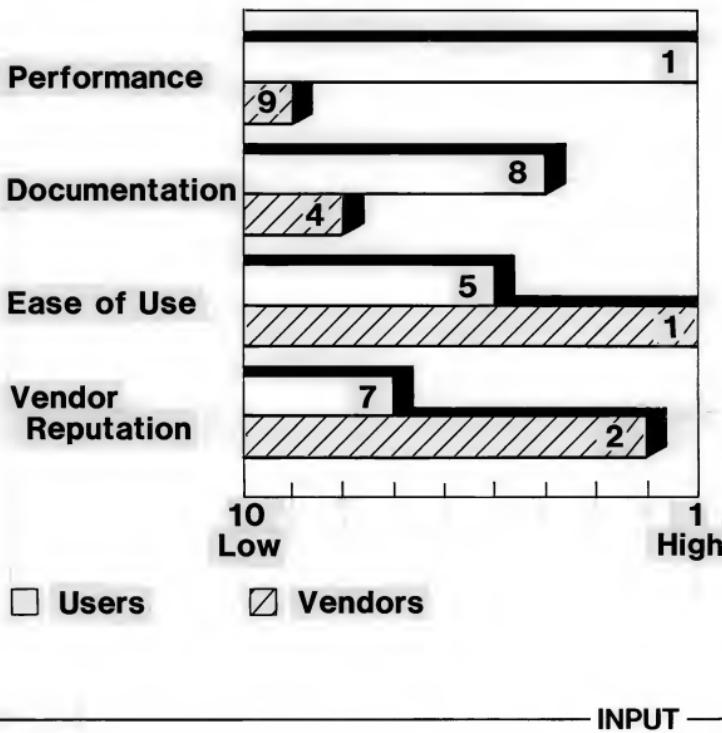
INPUT

DEPARTMENTS USING THE INFORMATION CENTER



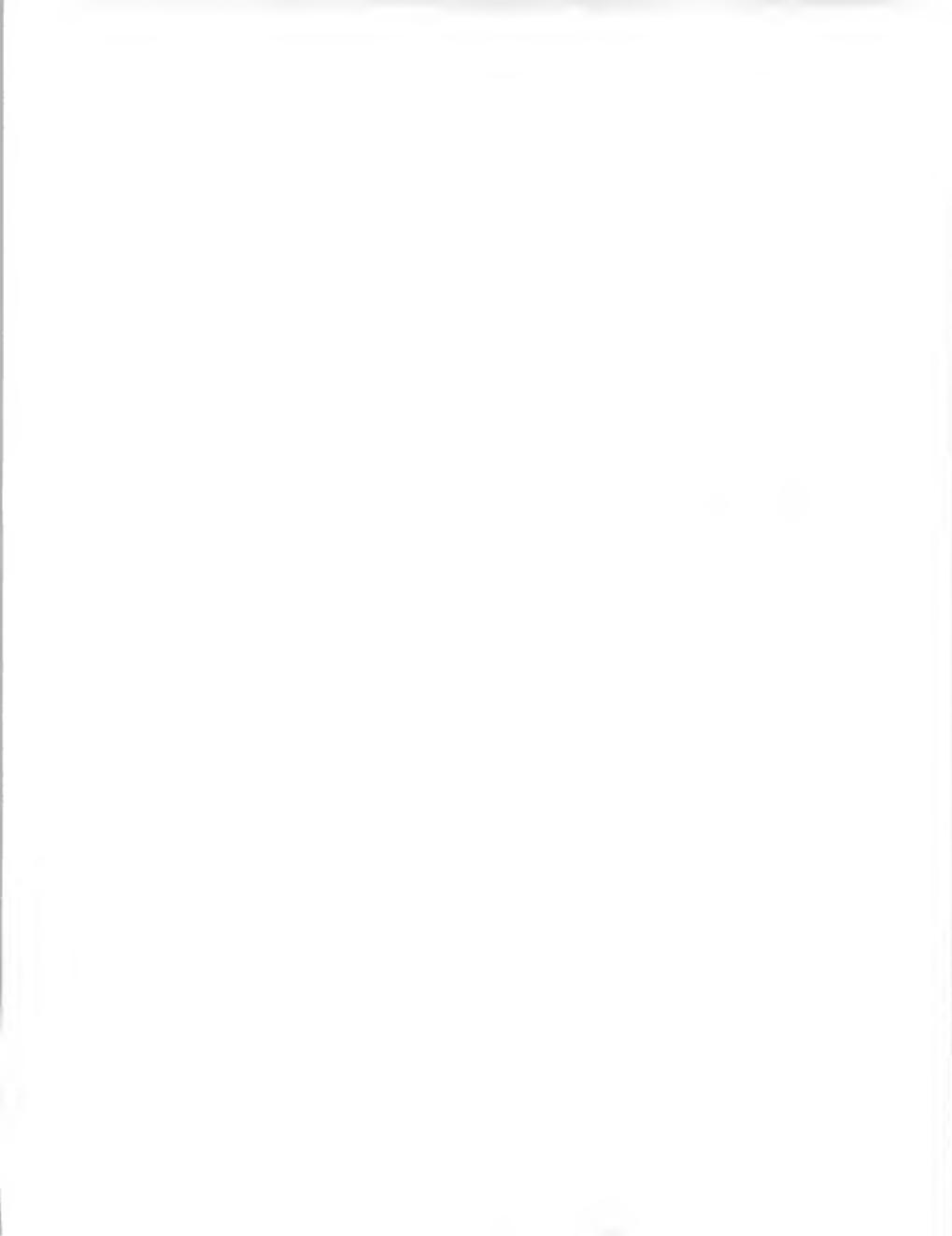
VENDORS ARE MISPERCEIVING SOME USER DECISION CRITERIA

(Mainframe/Mini Software Products)

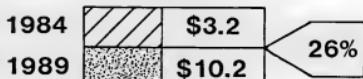
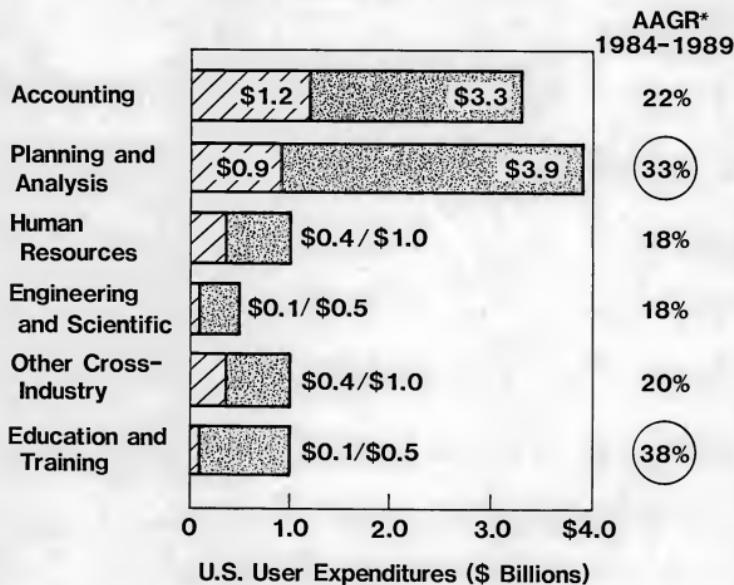


OPPORTUNITIES

INPUT



CROSS-INDUSTRY APPLICATIONS SOFTWARE MARKET, 1984-1989

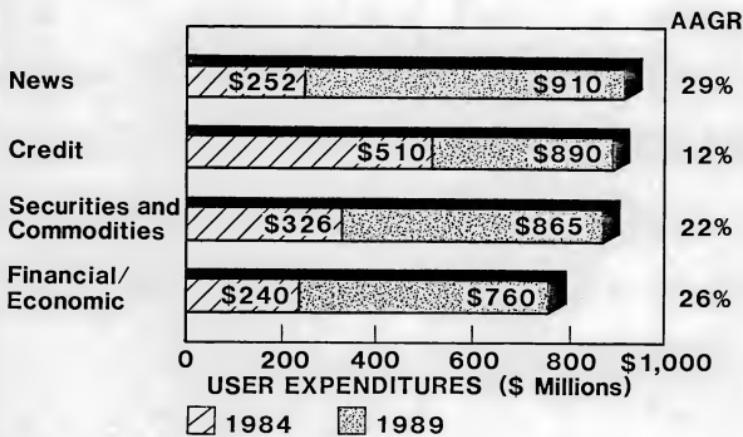


○ = Fastest Growing Markets

*Average Annual Growth Rate

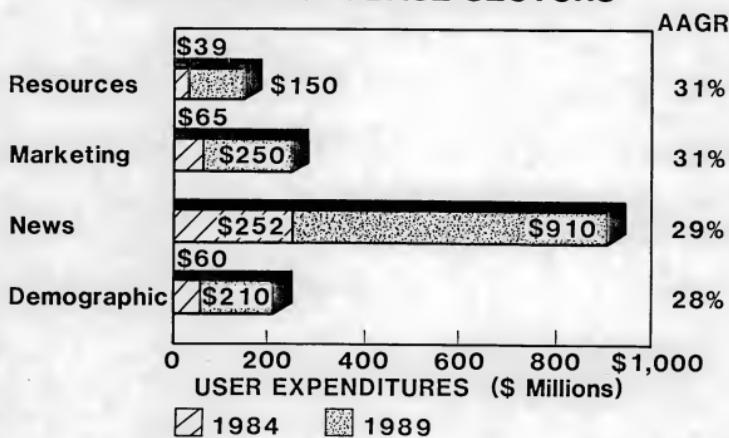
INPUT

LARGEST ON-LINE DATA BASE SECTORS



INPUT

FASTEST GROWING ON-LINE DATA BASE SECTORS



INPUT

DSS MATURITY STAGE REQUIREMENTS

	Stage I	Stage II	Stage III
Integrated Requirements	Standalone		
Differentiated Requirements		Linked	
Interfaced Requirements			Full Interfacing

INPUT



DSS OPPORTUNITIES BY STAGE AND TYPE OF PRODUCT/SERVICE

	Stage I	Stage II	Stage III
Software	Standalone	Linked	Full Interfacing
Remote Computing Services		Linked	
Turnkey Systems		Linked	Full Interfacing
Professional Services	Standalone	Linked	

INPUT



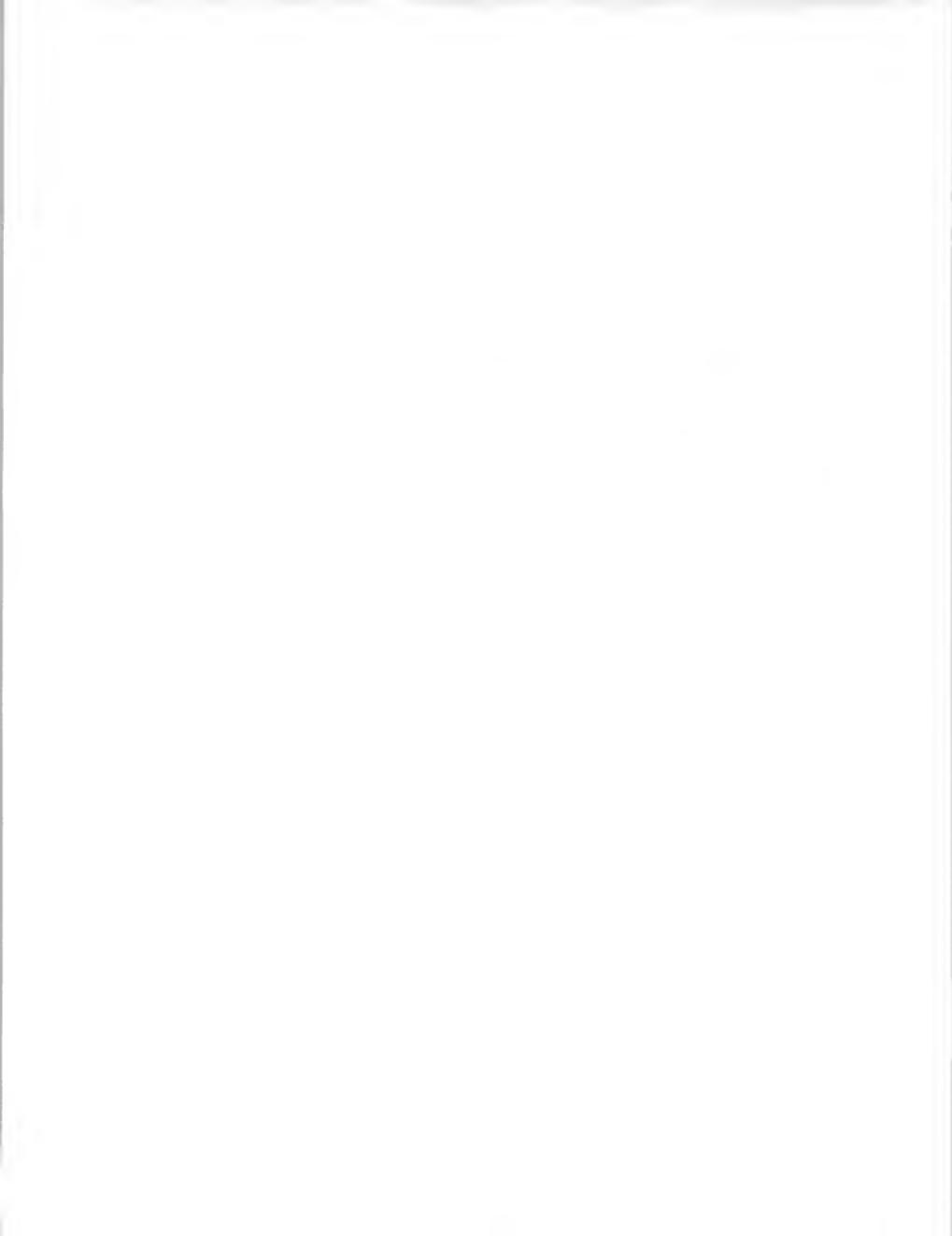
CONCLUSIONS AND RECOMMENDATIONS

INPUT

CONCLUSIONS

- **Markets Are Healthy**
- **Competition Will Be Larger, Stronger**
- **Systems Will Have Four-Way Integration**
- **Systems Software To Become Integral Part of Applications Software**
- **IS Department to Become a Distribution Channel**

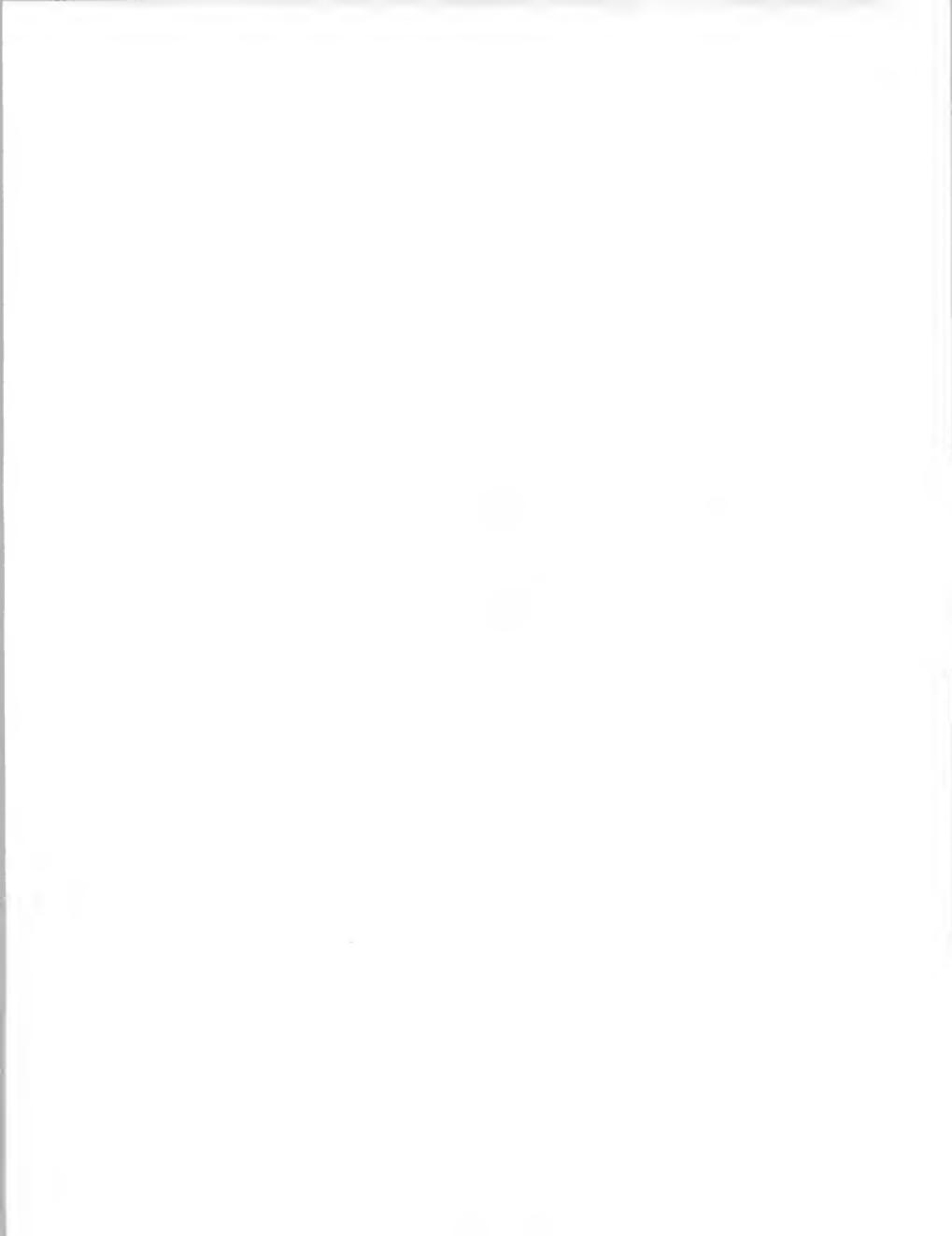
INPUT



EMPHASIZE "HIGH APPEAL" DSS COMPONENTS

- **Better Data Acquisition**
- **Fresher Information**
- **Improved Integration with Other Systems**
 - **Horizontal Links**
 - **Micro-Mainframe Links**
- **Enhanced What-If**
- **Expanded Problem Definition Support**

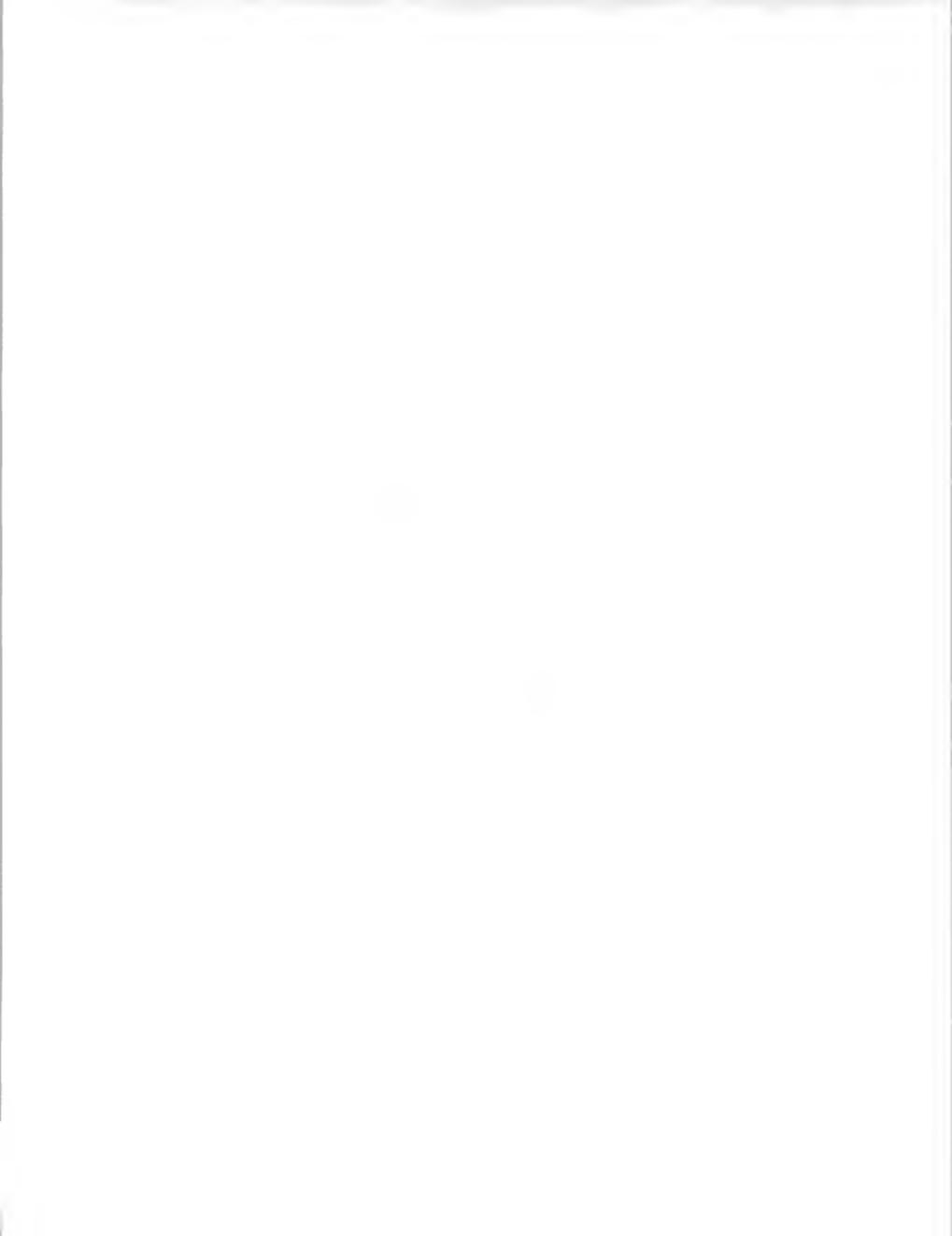
INPUT



**DECISION SUPPORT "SYSTEMS"
NEED DECISION SUPPORT "PEOPLE"**

- **Technology Ahead of People**
- **DSS - Evolution, Not Revolution**
 - Addresses Personal Activities
 - Changes Our Work Methods
- **Users Find Concepts Elusive**

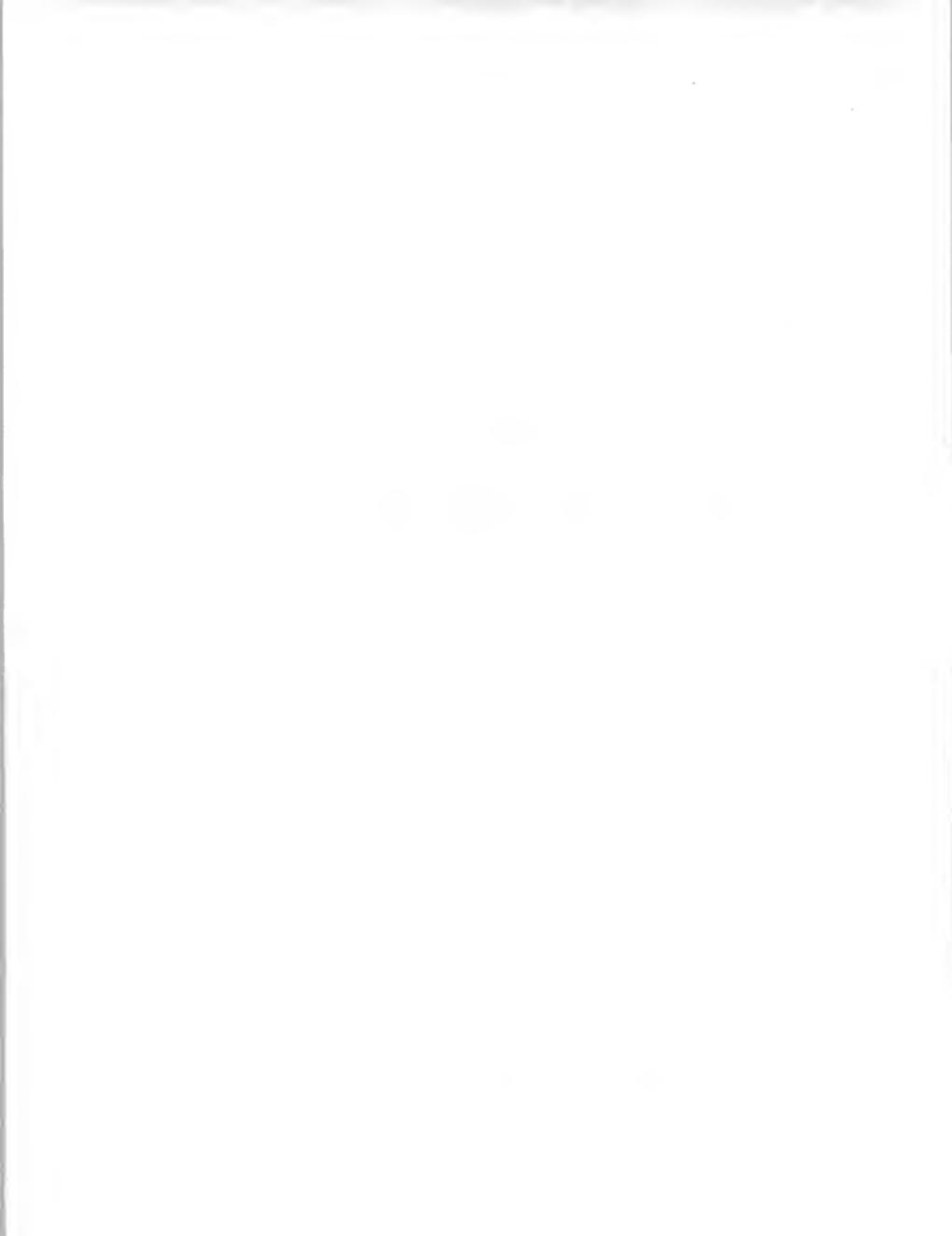
INPUT



KEYS TO SUCCESS

- **Explicitly Define Segment Targets**
 - Cross Industry
 - Industry Specific
- **Emphasize “High Appeal” DSS Components**
- **Make “Knowledge” the Real Product**
- **Provide Information-Heavy Value-Added**
- **Adopt a Product-Wide Systems Strategy**
- **Re-Tune Sales Tools, Training**
- **Accelerate Partnering**
- **Remember the User**

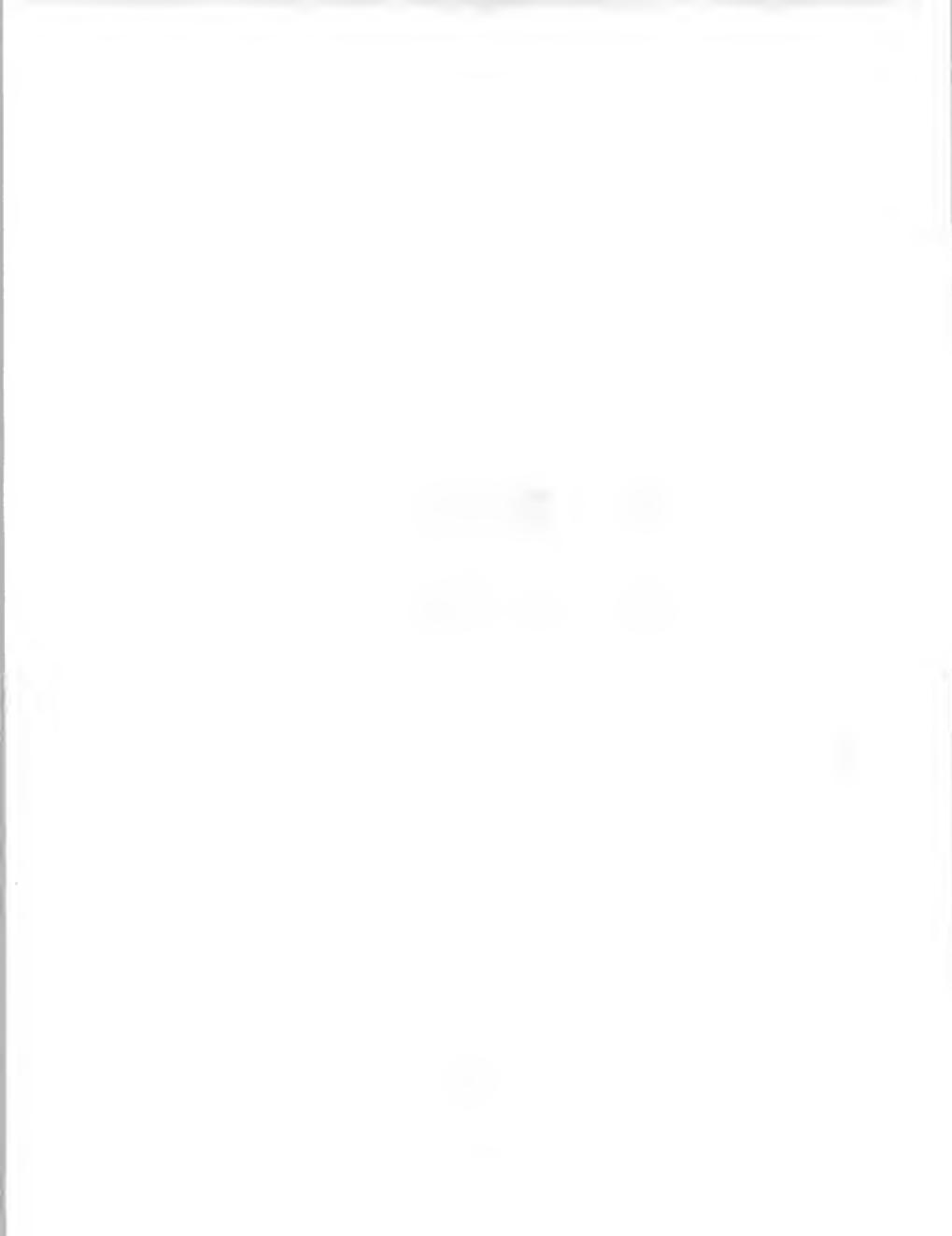
INPUT



EMPHASIZE "HIGH APPEAL" DSS COMPONENTS

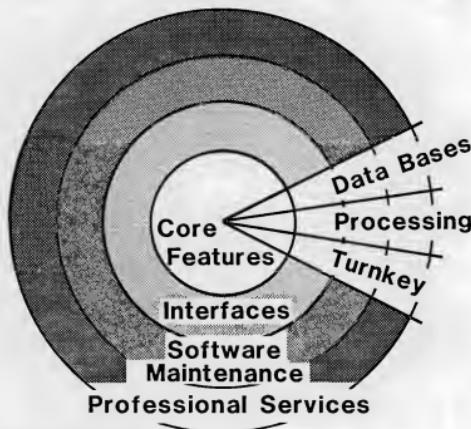
- Reduced Learning Time
- Better Performance
- Micro Versions of Mainframe Products

INPUT



KEYS TO SUCCESS

- Make "Knowledge" the Real Product



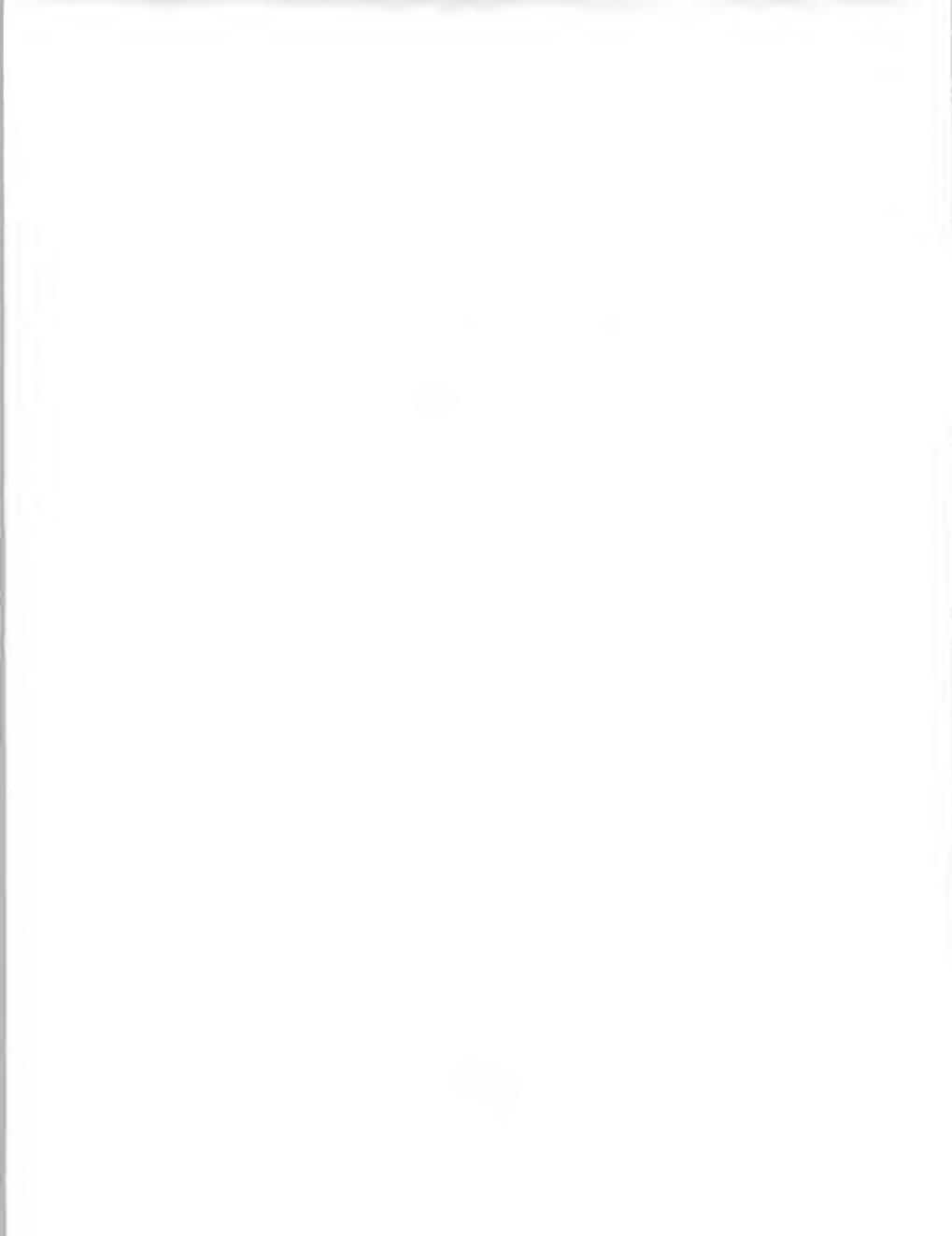
- Using Multiple . . .
 - Interfaces
 - Support Services
 - Delivery Modes

INPUT

PROVIDE INFORMATION-HEAVY VALUE-ADDED

- Offer New Types of Information Integration
- Improve Ties to Transaction Systems
- Provide Easier-To-Access Delivery Modes

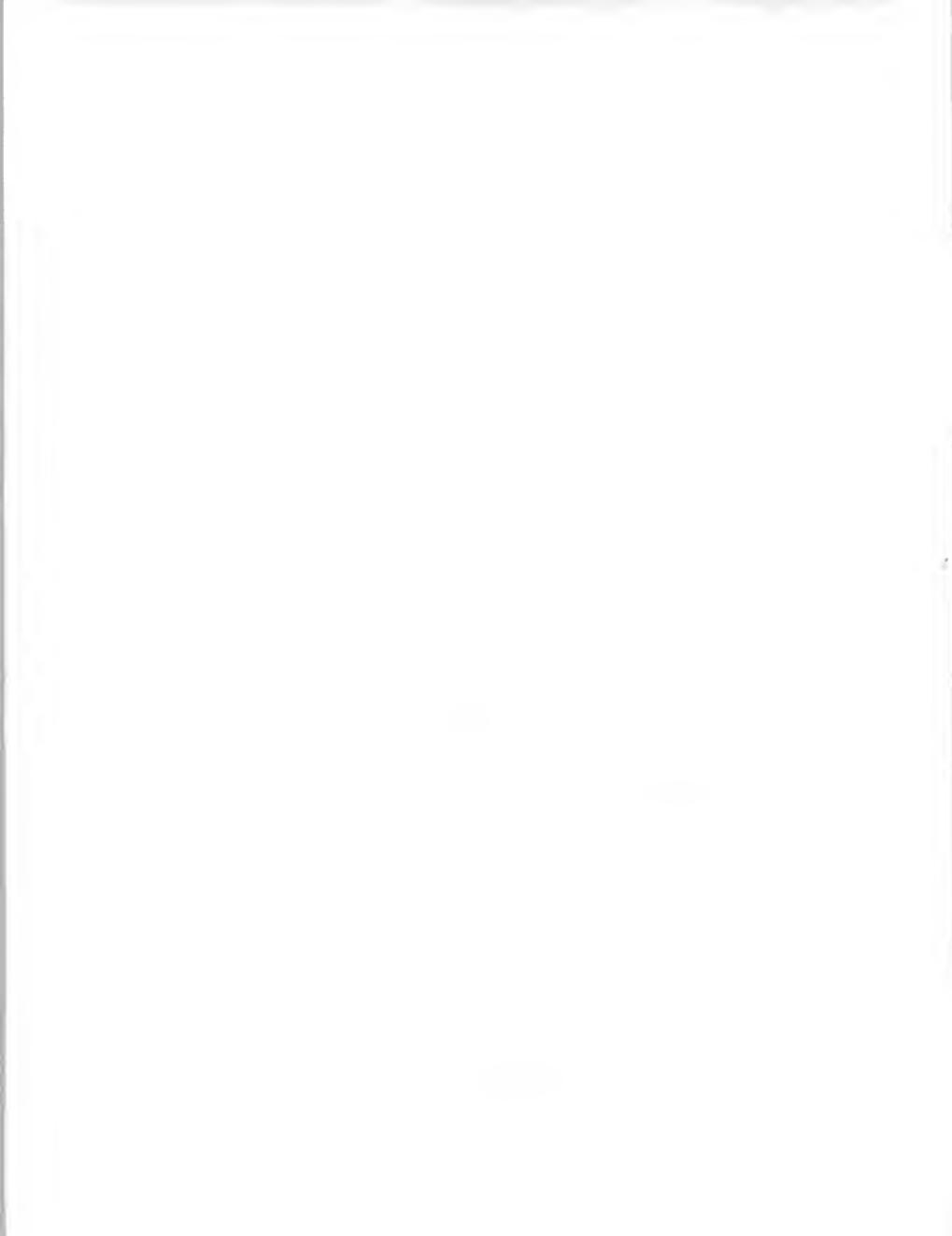
INPUT



HAVE A LONG-TERM PRODUCT-WIDE SYSTEMS STRATEGY

- Overlapping Market Segments
- Systems Compatibility
 - Command and File Software/Hardware
- Development Standards
- Payoffs
 - Increases Product Appeal
 - Builds Barriers to Competition
 - Lowers Marketing Costs
 - Leverages Technical Resources

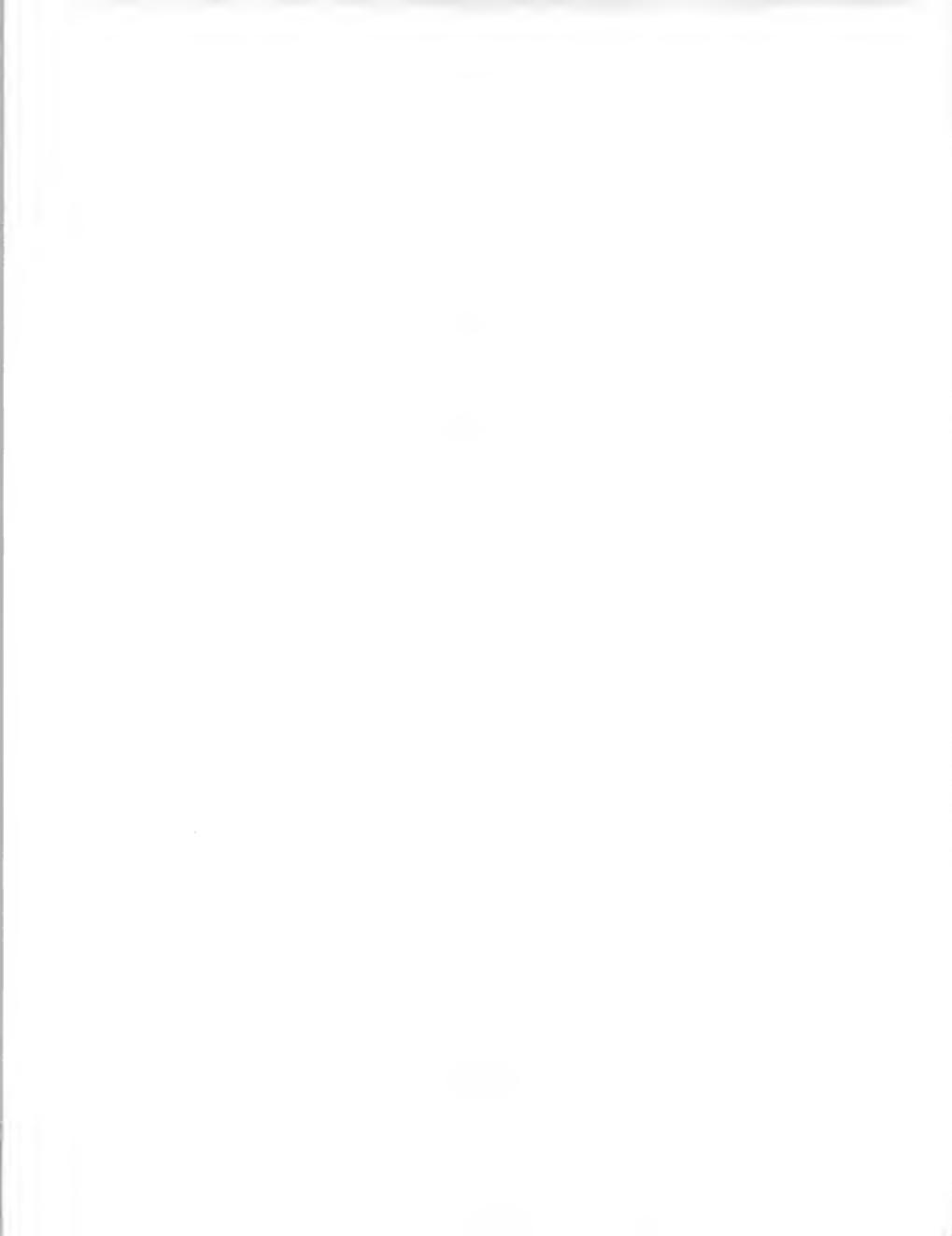
INPUT



RE-TUNE SALES TOOLS, TRAINING

- **Match Tools to Priority Segments**
- **Emphasize . . .**
 - Heavy Application-Orientation
 - Payoffs from Improved Decision-Making
 - Compatibility

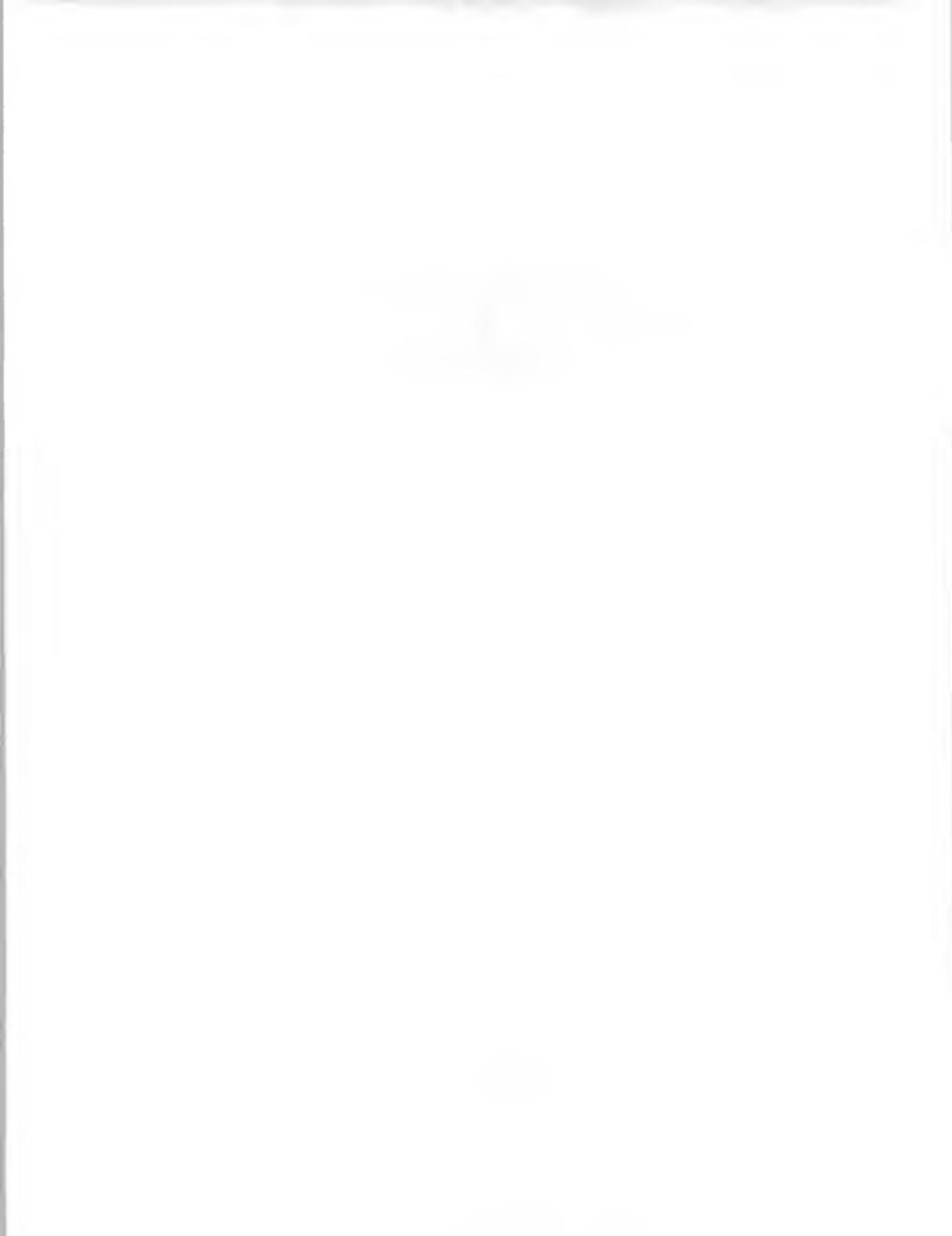
INPUT



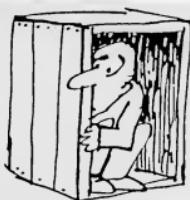
ACCELERATE PENETRATION VIA PARTNERING

- **Software**
- **Distribution**
- **Support**

INPUT



REMEMBER THE USER



FRAGILE! HANDLE WITH CARE

- Shield from Complexity**
- Recognize Psychological Impacts**
- Be Realistic Regards Rate of Acceptance**

INPUT

CONCLUSIONS:

- Abundant Opportunity**
- Bring Money**
- Bring Management**

INPUT

INPUT

- **Information Services Specialist**
- **10 Years in Business**
- **65 Person Staff**
- **Offices Worldwide**
- **Market Research Focus**
- **Personal Interview Based**

INPUT

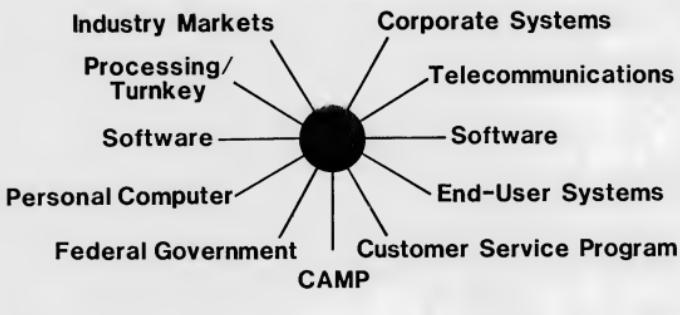
For
LM
Need tools
only - no
hard copy

INPUT RESEARCH SOURCES

- Subscription Programs
- Multiclient Projects
- Custom Consulting

INPUT

INPUT SUBSCRIPTION PROGRAMS



INPUT

GET YOUR RIGHTFUL SHARE!



INPUT

